

# RECOGNIZING ENERGY LEADERSHIP IN HOMEBUILDING BUILDERS CHALLENGE



## High Performance Builder Spotlight Rural Development Inc. Turners Falls, Massachusetts



### Affordable and Sustainable

Rural Development, Inc. (RDI) has made a name for itself as a builder of energy-efficient, sustainable, and affordable homes in western Massachusetts. The nonprofit, which serves as both developer and general contractor on its new home construction projects, builds up to 10 homes per year and each one meets a HERS index of 65 or lower achieving savings of at least 30% over the Building America benchmark home, according to Anne Perkins, RDI's Director of Home Ownership Programs.

RDI's efforts have not gone unnoticed. In 2007 RDI became the first builder in the nation to attain LEED silver certification for an affordable single-family home. In 2005 The Home Depot Foundation recognized RDI with its Award of Excellence for Affordable Housing Built Responsibility in the Homeownership Category.

“I think anybody building today could meet a HERS index of 70 or better.”

**ANNE PERKINS**  
RURAL DEVELOPMENT INCORPORATED

“We are not spending a lot of money to meet this,” said Perkins who estimated RDI's costs to get above code at about \$3000 for upgrades in windows, heating, plumbing, insulation, ventilation, and appliances.

RDI's standard construction includes several practical means for achieving their 55 to 65 HERS

index scores. RDI starts with a tight building envelope including blown-in dry dense pack cellulose insulation to R-19 in the walls and R-38 in the ceiling; sill, door, and window low density foam sealants; weather stripping of the basement door; U.28 insulated steel exterior doors; low-E argon-filled, U.28 windows; and a high-efficiency oil-burning boiler with indoor/outdoor sensors and outdoor air intake.

### Innovations

In 2006 RDI partnered with the U.S. Department of Energy's Building America Program and the Consortium for Advanced Residential Buildings (CARB), to achieve even greater levels of home performance. With design and technical advice from CARB, RDI and a local architect designed a near-zero energy prototype home in Colrain, Massachusetts. That home achieved a HERS index score of 21.

This incredible score was due in part to features including an R-20 insulated slab containing radiant floor heat coils that were heated by roof-mounted solar thermal collectors, which also provided domestic hot water. The home was equipped with 3.2 kW of roof-mounted photovoltaic panels for onsite power generation. It also featured a tankless water heater for auxiliary heat and hot water, ENERGY STAR appliances and lighting, and Low-e windows from Paradigm with Heat Mirror (U of 0.20). Perkins described this product as essentially akin to a three-pane window consisting of two glass panes sandwiching a thin, clear Low-e film that serves as a third layer of glazing without adding the weight of more glass. The building was very well insulated with R-50 attic cellulose and R-43 wall insulation thanks

### BUILDER PROFILE

**Rural Development Incorporated**  
[www.ruraldevelopmentinc.org](http://www.ruraldevelopmentinc.org)

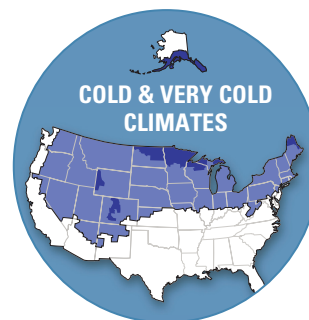
**Founded:** Created by the Franklin County Housing and Redevelopment Authority (HRA) in 1992

**Staff:** 7 full-time staff in the Home Ownership Program including 3 office staff and 4 carpenters

**Market:** Primarily low- and moderate-income home buyers

**Number of Houses to Date:**  
90 since 1992

**New Developments:** Wisdom Way Solar Village, 20-unit development in Greenfield, Massachusetts



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3/2008

## BUILDER SPOTLIGHT

## Rural Development Inc.



Double-stud walls contained over 11" of blown dry pack cellulose insulation to provide R-43 of wall insulation and an extra thick building envelope

### STANDARD RDI FEATURES

High efficiency boiler with indoor/outdoor sensors

Outdoor air intake to the boiler, indirect hot water tank, 2 zone heating system

Low E with argon windows U-value of .28

Quiet mechanical ventilation

Blown in dry cellulose insulation, R19 walls and R38 ceiling

Air sealing

Insulated steel exterior doors with a U-value of .28 and Insulated interior bulkhead door

2 x 6 exterior walls

Positioned on site for maximum solar gain

Insulated hot water and heating pipes

Compact fluorescent lighting

ENERGY STAR dishwasher and refrigerator

to a double-thick wall provided by double 2x4 construction with blown cellulose insulation. The studs were staggered to prevent thermal bridging across the 11.25 inch wall cavity.

The home was estimated to require 72% less energy to operate than a typical code-compliant home, with 74% of the home's electricity provided by the home's PV system, according to Robb Aldrich, of CARB.

"I think anybody building today could meet a HERS index of 70 or better," said Perkins who owned her own general contracting company for over 15 years, worked as a building inspector, taught carpentry, and worked for other affordable housing organizations prior to joining RDI in 1999.

## Dollars and Sense

Many of the features used in the Colrain house will be incorporated into a 20-home development that RDI is breaking ground on in winter 2007-08 in Greenfield, Massachusetts. HERS index scores for these homes are projected to be 21. Aldrich performed modeling on the Greenfield designs and found that one model showed energy cost savings of \$1050 over the HERS reference home (at energy costs of \$0.15/kWh and \$2.44/gal for oil).

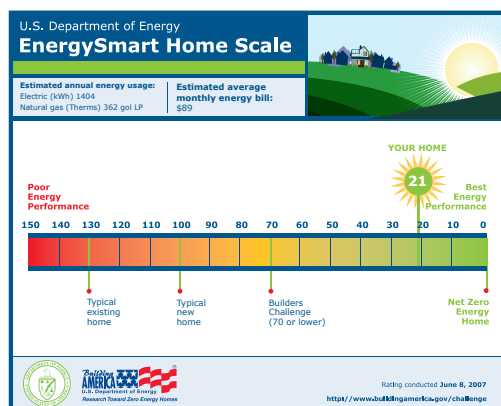
Perkins estimates that RDI increases costs just \$3,000 to cover the upgrades in windows, heating, plumbing, insulation, ventilation, and appliances that enable it to achieve homes with HERS index scores of 65 or less on its standard construction.

## U.S. Department of Energy Builders Challenge

DOE has posed a challenge to the homebuilding industry—to build 220,000 high performance homes by 2012. Homes that qualify for this Builders Challenge must meet a 70 or better on the EnergySmart Home Scale (E-Scale). The E-scale allows homebuyers to understand—at a glance—how the energy performance of a particular home compares with others. Through the Builders Challenge, participating homebuilders will have an easy way to differentiate their best energy-performing homes from other products in the marketplace, and to make the benefits clear to buyers.

The figure to the right shows an E-Scale for Rural Development Incorporated. The E-scale is based on the well-established Home Energy Rating System (HERS) index, developed by the Residential Energy Services Network. To learn more about the index and HERS Raters visit [www.natresnet.org](http://www.natresnet.org).

To learn more about the Builders Challenge and find tools to help market your homes, visit [www.buildingamerica.gov/challenge](http://www.buildingamerica.gov/challenge).



## The Building America Program

Building America is a private/public partnership sponsored by DOE that conducts systems research to improve overall housing performance, increase housing durability and comfort, reduce energy use, and increase energy security for America's homeowners. Building America teams construct test houses and community-scale projects that incorporate systems innovations. The teams design houses from the ground up, considering the interaction between the site, building envelope, mechanical systems, and other factors, and recognizing that features of one component in the house can greatly affect others. More than 40,000 energy-efficient houses have been built by the seven teams to date.

For more information visit [www.buildingamerica.gov](http://www.buildingamerica.gov). The website contains expanded case studies, technical reports, and best practices descriptions.